A REVISION OF THE NEARCTIC SPECIES OF CYMODUSOPSIS VIERECK

(HYMENOPTERA: ICHNEUMONIDAE)

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ABSTRACT

The nearctic species of Cymodusopsis Viereck (Hymenoptera: Ichneumonidae are revised and includes aristoteliae Viereck and eight species new to science: albiscapa; asperata; brevicauda; latifacies; macdunnoughi; melanosoma; nigricincta; variabilis.

INTRODUCTION

This revision describes eight new species in the nearctic fauna and provides a key to the identification of adult males and females as well as species groups. Each species is illustrated by means of scanning electron photomicrographs and their distributions plotted on maps.

The genotype, aristoteliae Viereck, was the only previously described species of Cymodusopsis prior to this publication

MATERIALS AND METHODS

The sources of specimens used in this study are the same as those listed in my revision of Xylophylax which occurs earlier in this contribution. The abbreviations used in regards to the deposition of type material are also the same.

The methods by which specimens are measured or described are the same as those published in my revision of Sinophorus (Sanborne, 1984) and are not repeated here.

The generic description which follows is essentially that of Townes, 1970, with appropriate additions and modifications.

Cymodusopsis Viereck

Cymodusopsis Viereck, 1912. U. S. Nat. Mus., Proc. 43: 588.
Type-species: Cymodusopsis aristoteliae Viereck. Examined in 1984.

Fore wing 3.2 - 6.5 mm. long. Body slender to moderately robust.

Eyes moderately convergent ventrad, with lower facets larger than upper facets, not distinctly hairy. Genal carina joining oral carina near base of mandible. Tentorial pit (clypeal fovea) separated from inner margin of cmpd. eye by distance 2.0-4.0 x dia. of single pit. Mandible short, its lower margin with narrow lamella near base, its teeth equal. Mesopleuron matte, with fine, sparse punctures (except *brevicauda* which has rather large, dense punctures). Posterior mesosternal carina complete. Propodeal spiracle round. Areola usually completely confluent with petiolar area, rarely partially or completely separated by transverse carina. Propodeal trough not or weakly excavated. Hind basitarsus without a mid ventral row of closely spaced hairs. Tarsal claws short, with weak to moderately strong teeth at base. Fore wing with areolet open (usually) or closed. Hind wing with nervellus often intercepted by discoidella. Abdominal petiole weakly decurving to straight, and lacking a glymma. Ovipositor 1.3-2.0 x as long as hind femur, slender to stout, straight to weakly upcurving.

The genus is distributed from the low arctic regions of Canada, Alaska, south to Central America and parts of South America. Its hosts are presumed to be microlepidoptera as is indicated by the meagre host records available.

Relationships. The relationship of *Cymodusopsis* to other *Porizontinae* is a matter of speculation at this point. Larval studies presently being conducted by David Wahl on the entire subfamily may shed more light on the matter. In my opinion, the similarities between *Cymodusopsis* and *Cymodusa* are superficial (e. g., convergent eyes, shape and form of abdominal petiole) and the result of convergence. There is a group of species within *Diadegma* (apparently all undescribed) that are even more similar and can only be separated from *Cymodusopsis* by the presence of a glymma on the abdominal petiole. If *Cymodusopsis* is related to this group of species it opens up the possibility that *Diadegma* or *Cymodusopsis* is a paraphyletic group. I choose to treat *Cymodusopsis* as a separate genus for the time being as it can easily be separated from *Cymodusa* (eyes not as strongly convergent in females and not distinctly hairy, tentorial pit much farther away from inner margin of cmpd. eye in *Cymodusopsis*) and from *Diadegma* which has distinct glymmae.

Key to the Nearctic Species Groups and Species of *Cymodusopsis* Viereck

1. Antennal scape and pedicel with frontal surfaces pale or white. Areola completely confluent with petiolar area, not indented at junction with petiolar area, the combined areas forming a broad trough (Figs. 3,4). ....Aristoteliae Group.2.

Antennal scape and pedicel uniformly black. Areola often partially, rarely completely separated from petiolar area by transverse carina, indented at junction with petiolar area (Figs. 5 - 12)........................3.

2. Abdominal tergites 2-6 with apical ferrugineous bands. Southwestern U.S. ....*albiscapa*, n. sp. (p. 6).

Abdominal tergites with antero-lateral corners ferrugineous, rarely with some tergites entirely ferrugineous, never with a banding pattern.... east of Rocky Mts...................... *aristoteliae* Viereck. (p. 4).

3. Second abdominal tergite approx. 1.0-1.2 x as long as wide in females, 1.4-1.5 x in males. Propodeal trough broad (Fig. 5), not coarsely wrinkled. Hind femur extensively to entirely black. Melanosoma Group Colorado.............................. *melanosoma*, n. sp. (p. 8).

Second abdominal tergite approx. 1.4-1.8 x as long as wide in females, 1.8-2.2 x in males. Propodeal trough not as broad (Fig. 6), usually coarsely wrinkled. Hind femur variously coloured. Nigricincta Group. ....(p. 10).

4. Areolet of fore wing closed (*variabilis* can be traced through both halves of couplet)..5.

Areolet of fore wing open..7.

5. Abdominal tergites extensively rufous. Ovipositor approx. 1.3 x as long as hind femur. Oregon.................*brevicauda*, n. sp. (p. 10)

Abdominal tergites black and ferrugineous banded or entirely black. Ovipositor approx. 1.6-1.8 x as long as hind femur...............6.

6. Abdominal tergites entirely black. British Columbia south to Colorado... ....*nigricincta*, n. sp. (p. 11)

Abdominal tergites with banding pattern. Widespread in U.S............ ....*variabilis*, n. sp. (p. 13)

7. Abdominal tergites with banding pattern........ *variabilis*, n. sp. (p. 13)

Abdominal tergites uniformly black or fuscous......................8.

8. Abdominal petiole with a dorso-lateral carina running from base to spiracle, the sides of petiole weakly concave. Ovipositor slender, its depth at mid length less than width of hind basitarsus. Boreal forests of Alaska and Canada........................*asperata*, n. sp. (p. 16)

Abdominal petiole without a dorso-lateral carina, its sides weakly convex. Ovipositor rather stout..9.

9. Cmpd. eyes weakly notched opposite antennal sockets. Face not unusually wide. Clypeus strongly convex. eastern North America............. ....*macdunnoughi*, n. sp. (p. 18)

Cmpd. eyes distinctly notched opposite antennal sockets. Face unusually wide. Clypeus weakly convex. western North America.............. ....*latifacies*, n. sp. (p. 20)

Aristoteliae Group

This group is characterized by a broad propodeal trough which is not indented at the junction of the areolar and petiolar areas and by the antennal scape and pedicel which are coloured white on their frontal surfaces. The group comprises two species, aristoteliae Viereck and albiscapa, n. sp.

Cymodusopsis aristoteliae Viereck

Fig. 3

Cymodusopsis aristoteliae Viereck, 1912. U. S. Nat. Mus., Proc. 43: 588 male, female. des. Holotype: Female. Kirkwood, Missouri (U. S. N. M.). Examined in 1984.

Cmpd. eyes strongly converging ventrad in female. Tentorial pit separated from inner margin of cmpd. eye by distance 2.0-2.5 x dia. of single pit in female. Second abdominal tergite approx. 1.6-1.8 x as long as wide in female. Propodeal trough very broad (Fig. 3). Fore wing with areolet usually closed. Antennal scape with frontal surface white.

Female. Antennal flagellum with 24-27 articles, with basal article approx. 4.5-4.7 x as long as wide. Antennal scape with inner margin approx. 1.4 x as long as outer mergin. Cmpd. eyes strongly converging ventrad, moderately hairy, with lower facets approx. 1.8 x as wide as upper facets. Tentorial pit separated from inner margin of cmpd. eye by distance approx. 2.0-2.5 x dia. of pit. Face strongly shagreened, matte, with moderately dense, silvery pubescence, its punctures minute. Clypeus moderately convex, with anterior margin moderately convex. Mesopleuron with lower 0.5 weakly to moderately shagreened, weakly polished to matte, sometimes with distinct rugosities anteriorly, its punctures medium sized and separated by distance 1.0-1.5 x dia. of single puncture. Propodeum short, with apex not projecting between bases of hind coxae. Areola completely confluent with petiolar area, the combined areas forming a broad trough with surface strongly rugosopunctate. Hind femur approx. 6.0 x as long as deep. Hind tarsal claw with weak teeth at base. Petiolar segment of abdomen weakly to moderately decurving, with petiole approx. 1.5-1.7 x as long as postpetiole. Second abd. tergite approx. 1.6-1.7 x as long as wide, with thyridium near basal 0.2. Ovipositor approx. 1.7-1.9 x as long as hind femur, nearly straight, with depth at mid length slightly greater than width of hind basitarsus. Fore wing approx. 3.1-6.5 mm. long, with areolet usually closed.

Antennal flagellum, head, thorax, petiolar segment, 2nd abd. tergite, median dorsal areas of tergites 3 to apex, hind coxa, black. Front of scape white. Palpi white to fulvous. Fore and middle coxae black to fulvous dorsally, yellow ventrally. Fore and middle trochanters yellow. Hind trochanter with basal segment fuscous, apical segment yellow. Femora, fore and middle tibiae, lateral areas of tergites 3 to apex, ferrugineous. Hind tibia with sub-basal and apical fuscous bands, the median band yellow-ferrugineous. Hind tarsal segments fuscous.

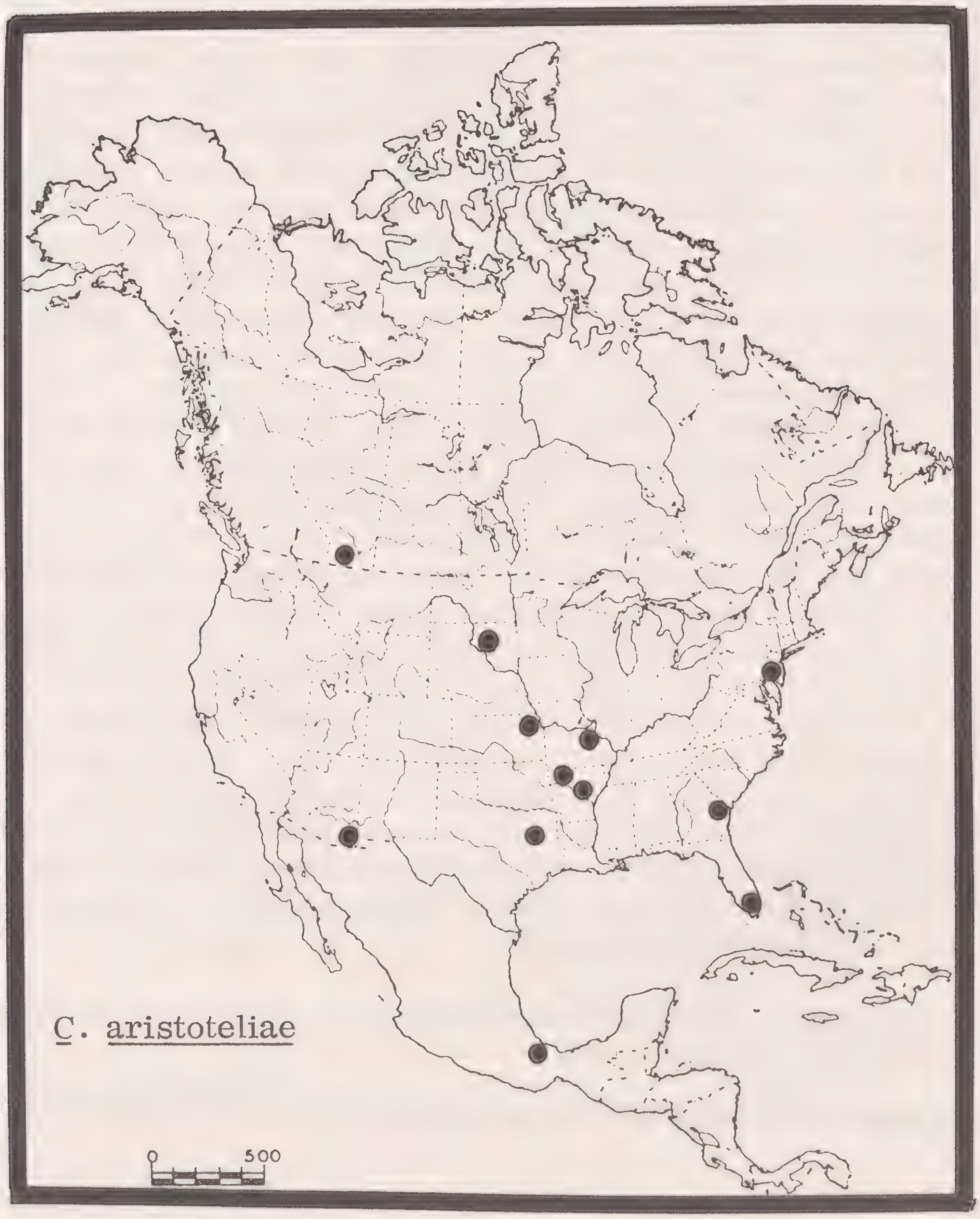
Male. Similar to female except that cmpd. eyes not as strongly convergent ventrad, hind femur slightly more stout, colour of tergites 3 to apex more extensively ferrugineous.

Material Examined. 4 males, 18 females

Distribution. CANADA. Alberta: Lethbridge. UNITED STATES. Arizona: Portal. Arkansas: Fayetteville; Little Rock. Florida: Hialeah. Georgia: St. Catherine Is., Liberty Co. Kansas. Douglas Co. Missouri: Columbia; Kirkwood. Texas: Carswell Airforce Base; Kerrville. Unknown State: Milford.

Host and Biology. This is a prairie grassland species. It has been reared from Aristotelia pudibundella (Gelechiidae) and a species of Loxostege (Pyralidae) on cotton. Peak abundance appears to be in June and July but adults are active from April to November indicating two or more generations.

Remarks. This species is very closely related to albiscapa but differs from it in the absence of a regular banding pattern on the tergites.



Cymodusopsis albiscapa, new species

Fig. 4

Cmpd. eyes moderately converging ventrad in females, with hairs slightly longer than normal. Fore wing with areolet open. Areola unusually short, broad. Ovipositor approx. 1.5 x as long as hind femur. Frontal surfaces of scape and pedicel marked with white. Abdominal tergites with regular banding pattern.

HOLOTYPE. Female. Antennal flagellum with 26 articles, the basal article approx. 4.8 x as long as wide. Antennal scape with inner margin approx. 1.4 x as long as outer margin. Cmpd. eyes moderately converging ventrad, with hairs slightly longer than normal (relative to other Porizontinae), with lower facets approx. 1.4 x as wide as upper facets. Face strongly shagreened, matte, with dense silvery pubescence arising from minute punctures. Tentorial pit separated from inner margin of cmpd. eye by distance approx. equal to 2.0 x dia. of pit. Clypeus weakly convex, its anterior margin moderately convex. Mesopleuron with lower 0.5 strongly shagreened, weakly polished, its punctures small, separated by distance 1.0-2.0 x dia. of single puncture. Propodeum moderately long, with apex projecting between bases of hind coxae approx. 0.3 x the length of coxa. Propodeal carinae weak, with costula absent. Areola completely confluent with petiolar area, approx. 0.7 x as wide and 0.2 x as long as petiolar area. Surface of petiolar area with numerous weak transverse wrinkles. Hind femur approx. 5.9 x as long as deep. Hind tarsal claw pectinate for over half its length. Petiolar segment of abdomen more or less straight, with petiole approx. 1.4 x as long as postpetiole, the sides of petiole smooth, polished. Second abdominal tergite approx. 1.8 x as long as wide. Ovipositor approx. 1.5 x as long as hind femur, nearly straight, with depth at mid length greater than width of hind basitarsus. Fore wing approx. 3.8 mm. long, with areolet open. Hind wing with nervellus weakly intercepted.

Antennal flagellum, head, thorax, abd. petiole, bases of abd. tergites 2-6, hind coxa (except extreme apex), basal segment of hind trochanter, black. Front of scape and pedicel white. Palpi, tegula, ivory. Fore and middle coxae, fore and middle trochanters, apical segment of hind trochanter, external surface of fore tibia, externo-median surface of middle tibia, white. Fore femur ferrugineous; middle femur ferrugineous with weak baso-ventral infuscated patch; hind femur ferrugineous with baso-ventral and apico-dorsal fuscous patches. Front tibia with internal surface ferrugineous; middle tibia weakly fuscous internally, with weakly fuscous sub-basal and apical bands; hind tibia with internal surface, sub-basal and apical bands, fuscous, the externo-median surface fulvous. Apical bands of abdominal tergites 2-4 ferrugineous, 5-6 fusco-ferrugineous.

Range and Variation. No significant variation in specimens at hand except size. Fore wing 3.3-4.1 mm. long.

Male. Unknown

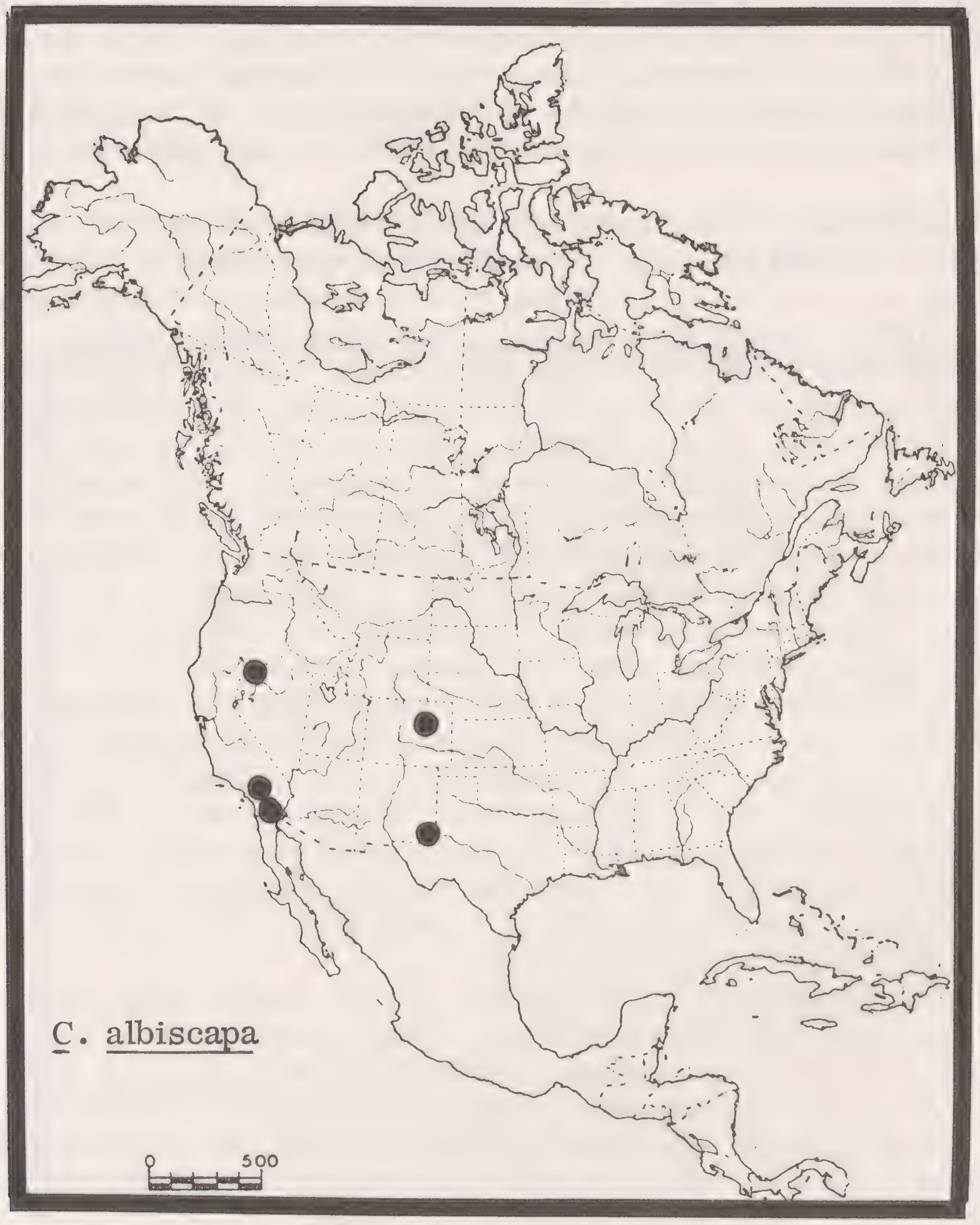
Holotype. Female. Denio, Nevada, May 31 1978, H. & M. Townes. Deposited in H. & M. Townes collection, Gainesville, Florida.
Paratypes. California: Davis, VIII-20, 1955 (1 female), A.T. McClay (UCB); Mint Canyon, Solemint 28-VI-1955 (1 female), W. R. Richards (CNC).

Colorado. Boulder, 4.5 mi. w., 5500', June 20, 1961 (1 female), W. R. M. Mason (CNC). Nevada: One female, same data as for holotype.

Etymology. The species epithet refers to the white markings on the front of the antennal scape and pedicel.

Host and Biology. There are no rearing records for this species. There appear to be two generations per year.

Remarks. See remarks under aristoteliae, p. 5.



Melanosoma Group

This group is characterized by the unusually robust body, broad petiolar trough which is indented at the junction of the areola and petiolar region, and by the second abdominal tergite which is approx. as long as wide in females.

The group comprises a single species, melanosoma, n. sp.

Cymodusopsis melanosoma, new species

Fig. 5

Cmpd. eyes moderately converging ventrad in females, not distinctly hairy. Lower 0.5 of mesopleuron with rugosities. Propodeal trough broad, with petiolar area lacking distinct transverse wrinkling. Petiolar segment of abdomen moderately decurving, the petiole with a weak carina from base to spiracle. Second abdominal tergite of female approx. as long as wide. Ovipositor approx. 1.7-1.8 x as long as hind femur. Body extensively black.

HOLOTYPE. Female. Antennal flagellum with 23 articles, the basal article approx. 4.3 x as long as wide. Antennal scape with inner margin approx. 1.4 x as long as outer margin. Cmpd. eyes moderately converging ventrad, with hairs slightly longer than normal, with lower facets approx. 1.4 x as wide as upper facets. Face strongly shagreened, matte, with minute punctures. Tentorial pit separated from inner margin of cmpd. eye by distance approx. equal to 1.5 x the dia. of pit. Clypeus strongly convex, its anterior margin weakly convex. Mesopleuron with lower 0.5 strongly shagreened, matte, with distinct rugosities, the punctures small. Propodeum moderately long, with apex projecting between bases of hind coxae approx. 0.3 x length of hind coxa. Propodeal carinae strong, complete. Areola approx. 0.5 x as wide and 0.5 x as long as petiolar area, separated from petiolar area by weak transverse carina. Petiolar area very broad without distinct transverse wrinkling. Hind femur approx. 4.9 x as long as deep. Hind tarsal claw with teeth extending over half the length of claw. Petiolar segment of abdomen moderately decurving, with petiole approx. 1.4 x as long as postpetiole, with a weak dorso-lateral carina running from base to spiracle. Second abdominal tergite approx. 1.1 x as long as wide. Ovipositor approx. 1.7 x as long as hind femur, weakly upcurving, with depth at mid length approx. equal to width of hind basitarsus. Fore wing approx. 3.7 mm. long, with areolet open. Hind wing with nervellus weakly intercepted.

Antennal flagellum, scape, pedicel, head, thorax, abdomen, coxae, trochanters, basal 0.4 of middle femur, hind femur, black. Palpi, tegula, fulvous. Fore femur ferrugineous; middle femur with apical 0.6 ferrugineous. Fore tibia ferrugineous internally, whitish externally; middle tibia fuscous internally, with fuscous sub-basal and apical bands, the externo-median surface whitish; hind tibia coloured as middle tibia except that externo-median surface pale ferrugineous. Hind tarsal segments fuscous.

Range and Variation. Antennal flagellum with 23-25 articles, the basal article 4.2-4.5 x as long as wide. Propodeum with areola partially to entirely separated from petiolar area by incomplete to complete transverse carina. Ovipositor approx. 1.7-1.8 x as long as hind femur. Fore wing 3.2-3.8 mm.

long. Palpi fulvous to fuscous. Tegula fulvous to fuscous. Apical segment of fore trochanter yellow to black. fore femur often infuscated basally.

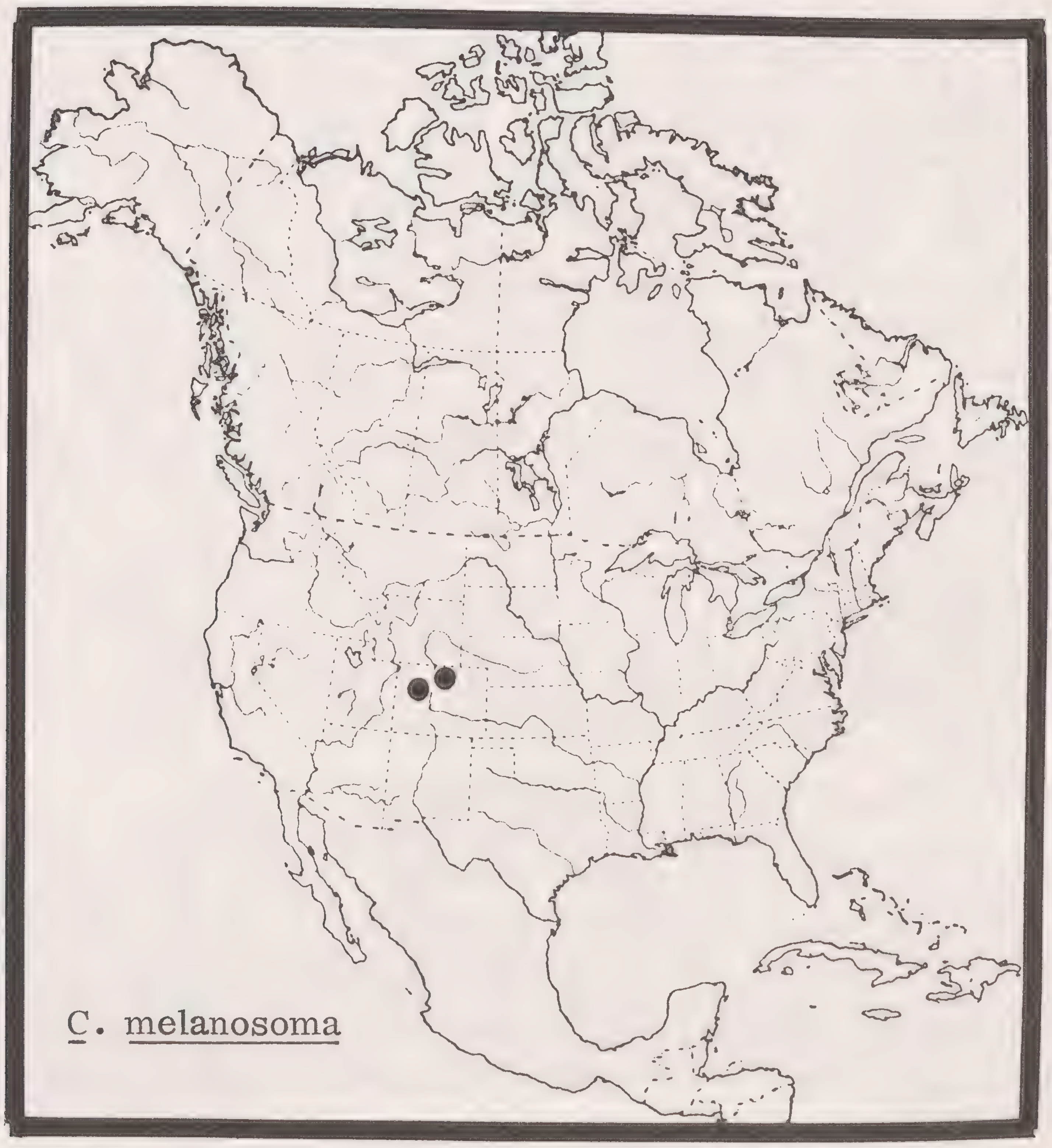
Male. Hind femur 4.5-4.8 x as long as deep. Second abdominal tergite approx. 1.4-1.5 x as long as wide. Coloured as female except that infuscation of femora often greater.

Holotype. Female. Independence Pass, Lake Co., 12,100', Colorado, 31-VII-1961, tundra, B. H. Poole. Deposited in Canadian National Insect Collection, Ottawa.
Paratypes. 18 males, 16 females, same data as for holotype except that 6 specimens captured 8-VIII-1961. Colorado. Hoosier Pass, 12,000', 8-VIII-1961, (1 male, 2 females), B. H. Poole (CNC); Loveland Pass, 12,000' summit, 7-VIII-1961 (3 females), B. H. Poole (CNC).

Etymology. The species epithet refers to the highly melanic colouration of this species.

Host and Biology. There are no rearing records for this species. All specimens have been taken at an altitude of approx. 12,000' in tundra conditions.

Remarks. The very broad petiolar area, nearly square 2nd abd. tergite and extensive black colouration distinguishes this species from all other neartic Cymodusopsis.



Nigricincta Group

This group is characterized by the elongate second abdominal tergite (approx. 2.0 x as long as wide), and narrow, coarsely wrinkled propodeal trough which is distinctly constricted at the junction of the areolar and petiolar areas. The group comprises six species: brevicauda n. sp., nigricincta n. sp., variabilis n. sp., asperata n. sp., macdunnoughi n. sp., and latifacies n. sp. There are some features of brevicauda which may indicate that this species is incorrectly placed, specifically, the weakly convergent cmpd. eyes whose upper and lower facets are approx. equal sized, the very short ovipositor, and the extensively red abdomen which is unique to the genus.

Cymodusopsis brevicauda, new species

Fig. 7

Cmpd. eyes weakly converging ventrad in female, with hairs slightly longer than normal, with lower facets slightly larger than upper facets. Fore wing with areolet closed. Ovipositor approx. 1.3 x as long as hind femur. Abdominal tergites 3 to apex entirely rufous.

HOLOTYPE. Female. Antennal flagellum with 38 articles, the basal article approx. 4.0 x as long as wide. Antennal scape with inner margin approx. 1.4 x as long as outer margin. Cmpd. eyes weakly coverging ventrad, with hairs only slightly longer than normal, with lower facets approx. 1.2 x as wide as upper facets. Face with dense silvery pubescence arising from minute punctures. Tentorial pit separated from inner margin of cmpd. eye by distance approx. equal to 3.0x dia. of pit. Clypeus unusually broad, nearly flat, with anterior margin weakly convex. Mesopleuron with lower 0.5 coarsely, densely punctate. Propodeum moderately long, with apex projecting between bases of hind coxae approx. 0.3 x the length of hind coxa. Propodeal carinae strong, complete. Areola and petiolar area completely confluent. Petiolar area with coarse, reticulate pattern of wrinkling. Hind femur approx. 5.6 x as long as deep. Hind tarsal claw nearly straight, with weak teeth at base. Petiolar segment of abdomen moderately decurving, the sides of petiole weakly excavated, the petiole approx. 1.5 x as long as postpetiole. Second abdominal tergite approx. 1.4 x as long as wide, with thyridium near basal 0.2. Ovipositor approx. 1.3 x as long as hind femur, weakly upcurving, with depth at mid length approx. equal to width of hind basitarsus. Fore wing approx. 6.5 mm. long, with areolet closed. Hind wing with nervellus intercepted at base.

Antenna, head, thorax, petiolar segment of abdomen, basal 0.8 of 2nd abdominal tergite, mid dorsal triangular area at base of 3rd abdominal tergite, dorsal surfaces of fore and middle coxae, entire hind coxa, basal segment of hind trochanter, hind tarsal segments 4, 5, black. Median area of mandible, palpi, tegula, ventral surfaces of fore and middle coxae, most of fore and middle trochanters, apical segment of hind trochanter, yellow. Femora, tibiae, tarsal segments 1-3 (all legs), ferrugineous. Apical 0.2 of 2nd abdominal tergite, most of 3rd tergite, tergites 4 to apex, rufous. Wings weakly infuscate.

Range and Variation. Known only from holotype.

Male. Unknown

Holotype. Female. French Glen, Oregon, VII-10-1978, H. & M. Townes. Deposited in Townes collection, Gainesville, Florida.

Etymology. The species epithet refers to the unusually short ovipositor.

Host and Biology. Unknown

Remarks. The combination of weakly converging eyes, broad clypeus, short ovipositor, and extensively red abdomen clearly distinguishes this species from all other nearctic Cymodusopsis.

Cymodusopsis nigricincta, new species

Cmpd. eyes moderately converging ventrad in female, with hairs of normal length. Basal article of antennal flagellum 3.7-3.8 x as long as wide. Fore wing with areolet closed. Ovipositor approx. 1.6-1.7 x as long as hind femur, straight, with depth at mid length greater than width of hind basitarsus. Abdomen black.

HOLOTYPE. Female. Antennal flagellum with 34 articles, the basal article approx. 3.8 x as long as wide. Antennal scape with inner margin approx. 1.4 x as long as outer margin. Cmpd. eyes moderately converging ventrad, not distinctly hairy, with lower facets approx. 1.4 x as wide as upper facets. Tentorial pit separated from inner margin of cmpd. eye by distance approx. equal to 2.0 x dia. of pit. Face strongly shagreened, matte, with small punctures which are separated by distance less than or equal to dia. of single puncture. Clypeus moderately convex, with anterior margin moderately convex. Mesopleuron with lower 0.5 shagreened, weakly polished, with medium sized punctures which are separated by distance less than or equal to dia. of single puncture, with some rugosities present medially. Propodeum moderately long, with apex projecting between bases of hind coxae approx. 0.3 x the length of hind coxa. Areola completely confluent with petiolar area, polished, with weak wrinkling. Petiolar area with numerous, coarse transverse wrinkles. Hind femur approx. 5.5 x as long as deep. Hind tarsal claw with weak teeth at base. Petiolar segment of abdomen moderately decurving, the sides of petiole weakly excavated apically. Petiole approx. 1.5 x as long as postpetiole. Second abdominal tergite approx. 1.8 x as long as wide, with thyridium near basal 0.2. Ovipositor approx. 1.8 x as long as hind femur, straight, with depth at mid length greater than width of hind basitarsus. Fore wing approx. 5.5 mm. long. Hind wing with nervellus not intercepted.

Antenna, head, thorax, abdomen, coxae, basal segment of all trochanters, black. Palpi fulvous. Tegula white. Apical segment of fore trochanter yellow; apical segment of middle trochanter pale fulvous; apical segment of hind trochanter fuscous basally, ferrugineous apically. Femora, fore and middle tibiae, ferrugineous. Hind tibia with base and apex weakly infuscated, the median area ferrugineous. Hind tarsus fuscous. Ovipositor unusually dark. Wings weakly infuscated.

Range and Variation. Antennal flagellum with 25-34 articles, the basal article 3.8-3.9 x as long as wide. Antennal scape with inner margin 1.3-1.4 x as long as outer margin. Petiole approx. 1.4-1.5 x as long as postpetiole. Second abdominal tergite approx. 1.6-1.8 x as long as wide. Ovipositor approx. 1.7-1.8 x as long as hind femur. Hind femur approx. 5.3-5.6 x as long as deep. Fore wing approx. 4.5-5.5 mm. long.

Basal segment of fore trochanter yellow to black. Fore coxa black dorsally, yellow ventrally, to entirely black. Hind femur often with some infuscation ventrally.

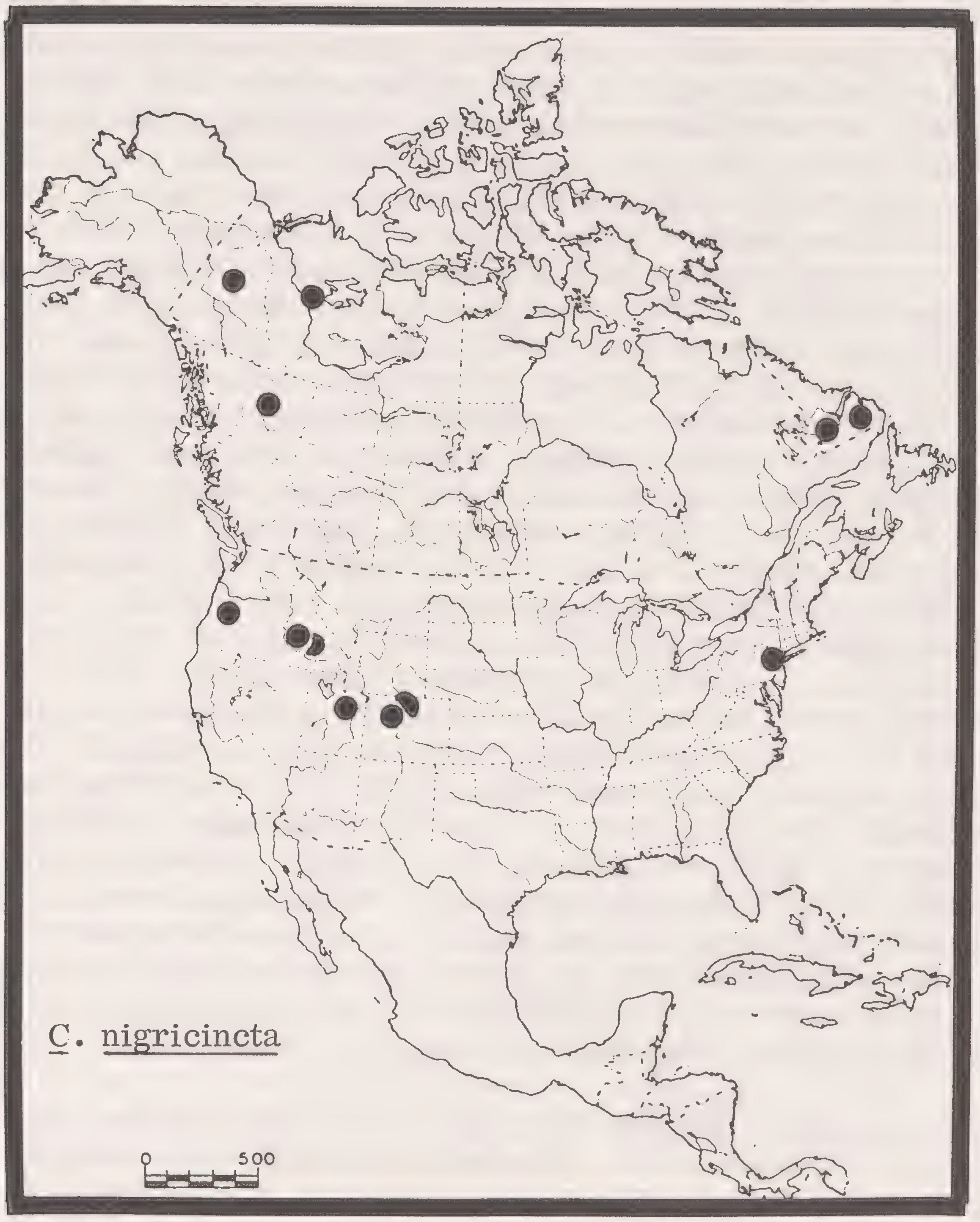
Male. Hind femur approx. 5.2-5.4 x as long as deep. Petiolar segment of abdomen weakly decurving. Colour as in female.

Holotype. Female. Stone Mt. Pk., British Columbia, 3800', VII-19-1973, H. & M. Townes. Deposited in Townes collection, Gainesville, Florida. Paratypes. CANADA. British Columbia: Stone Mt. Pk., VII-17-22-1973, (4males, 4 females), H. & M. Townes (HMT). UNITED STATES. Colorado: Doolittle Ranch, Mt. Evans, 9800', VII-4, VII-18, 1964 (2 males, 1 female), C. Dasch (CDC) and VIII-3-1961 (1 female), W. R. M. Mason (CNC); Echo Lake, Mt. Evans, 10,600', VIII-4-1961 (1 female), S. M. Clark (CNC); Fort Collins, May, (18)94, on alfalfa (1 male, 2 females), coll. ?, (USNM); Gould, VIII-6-1974 (2 females), H. & M. Townes (HMT); Loveland Pass, 1990', VII-18-1964 (1 female), C. Dasch (CDC); Phantom Valley, R.M.N.P., 9400', June 16, 1948 (1 male), H.,M., G., D., & J. Townes (HMT); West Chicago Cr., 9800', VII-25- 1964 (1 female), C. Dasch (CDC). Idaho: Galena Summit, nr. Stanley, 8700', VIII-4-1978 (1 female), H. & M. Townes (HMT); Stanley, Aug. 2-9, 1978 (9 females), H. & M. Townes (HMT). Washington: Mt. Ranier, VII-8-1940 (2 males, 3 females), 5700', H. & M. Townes (HMT). Wyoming: Battle Lake Rd., Sierra Madre, 8,000', VII-18-1961 (1 female), J. G. Chilcott (CNC).

Etymology. The species epithet is in reference to the black colouration of the abdomen.

Host and Biology. There are no rearing records for theis species although a number of speciemens have been collected on alfalfa. Adults are active from May to August indicating two or more generations per year in some areas.

Remarks. This species is most closely related to the *asperata-variabilis* sister pair but can be distinguished by the larger size, fore wing with areolet closed, and black colouration of the abdomen.



Cymodusopsis variabilis, new species

Fig. 8

Cmpd. eyes moderately covergent ventrad in females, with hairs slightly longer than normal, with lower facets approx. 1.4x as wide as upper facets. Propodeum long, with apex projecting between bases of hind coxae a distance approx. equal to 0.4 x the length of hind coxa. Petiolar segment of abdomen weakly decurving. Ovipositor with depth at mid length greater than width of hind basitarsus. Hind wing with nervellus intercepted.

HOLOTYPE. Female. Antennal flagellum with 26 articles, the basal article approx. 5.0 x as long as wide. Antennal scape with inner margin approx. 1.5 x as long as outer margin. Cmpd. eyes moderately covergent ventrad, with hairs slightly longer than normal, with lower facets approx. 1.4 x as wide as upper facets. Width of frons along line intersecting posterior margins of antennal sockets approx. 1.5 x width of face at level of posterior margin of clypeus. Face strongly shagreened, matte, with dense silvery pubescence arising from minute punctures. Clypeus strongly convex, its anterior margin moderately convex. Tentorial pit separated from inner margin of cmpd. eye by distance approx. equal to 3.0 x dia. of pit. Mesopleuron with lower 0.5 strongly shagreened, matte, with minute punctures which are separated by distance approx. equal to dia. of single puncture. Propodeum long, its apex projecting between bases of hind coxae a distance approx. equal to 0.4 x length of hind coxa. Propodeal carinae strong, complete. Areola approx. 0.5 x as wide as petiolar area, completely confluent with petiolar area. Petiolar area with numerous coarse, transverse wrinkles. Hind femur approx. 6.4 x as long as deep. Petiolar segment of abdomen weakly decurving, the petiole approx. 1.5 x as long as postpetiole, with sides smooth, polished. Second abdominal tergite approx. 1.8 x as long as wide. Ovipositor approx. 1.6 x as long as hind femur, weakly upcurving, with depth at mid length greater than width of hind basitarsus. Fore wing approx. 3.5 mm. long, with areolet open. Hind wing with nervellus intercepted.

Antenna, head, thorax, petiolar segment of abdomen, bases of abdominal tergites 2-6, hind coxa, black. Palpi pale fulvous. Tegula white. Fore coxa fuscous dorsally, yellowish ventrally; middle coxa ferrugineous dorsally, yellowish ventrally. Fore and middle trochanters mostly yellowish; hind trochanter with basal segment fuscous, apical segment yellow. Femora ferrugineous. Fore tibia whitish externally, ferrugineous internally; middle tibia with extreme base and externo-median surface white, the sub-basal and apical bands and internal surface, ferrugineous; hind tibia fusco-ferrugineous, with very weak sub-basal and apical bands. Hind tarsus fuscous. Apical bands of abdominal tergites 2-6 more or less ferrugineous.

Range and Variation. Antennal flagellum with 24-28 articles, the basal article 4.8-5.0 x as long as wide. Antennal scape with inner margin approx. 1.4-1.5 x as long as outer margin. Areola approx. 0.4-0.5 x as wide as petiolar area. Hind femur approx. 6.2-6.5 x as long as deep. Petiolar segment of abdomen straight to weakly decurving. Ovipositor approx. 1.5-1.7 x as long as hind femur. Fore wing with areolet open (usually) or closed. Hind femur ferrugineous but showing varying degrees of infuscation, particularly basally and ventrally. Hind tibia ferrugineous with weak sub-basal and apical bands and showing varying degrees of infuscation with resulting loss of banding pattern . Abdominal tergites 2 to apex with ferrugineous apical bands to entirely black, with many intermediates.

Male. Hind femur approx. 5.8-6.0 x as long as deep. Coloured as female but with much greater tendency towards melanism so that abdominal tergites very commonly uniformly dark.

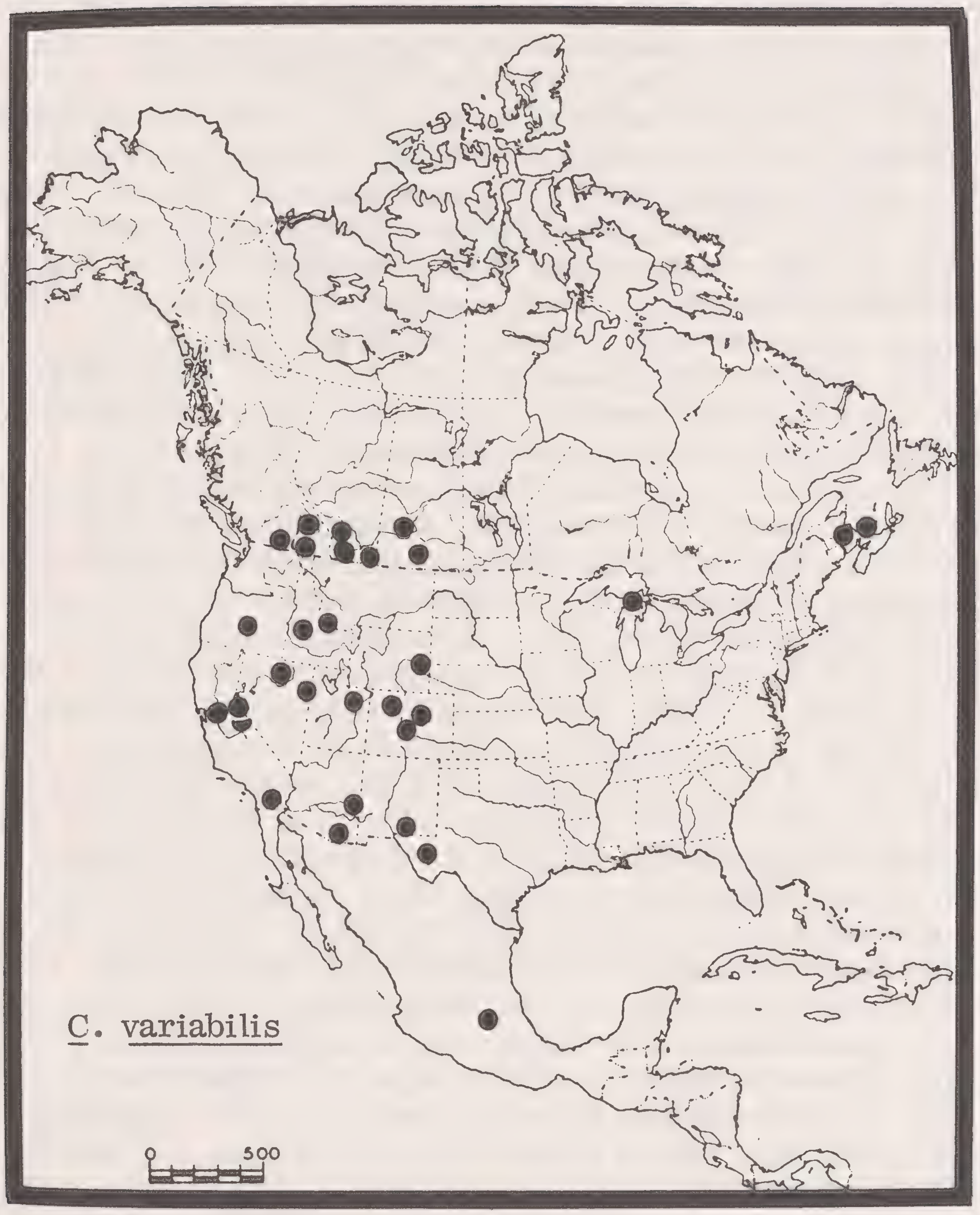
Holotype. Female. Iron Co., Michigan, July 1, 1970, Nemah Hussain. Deposited in Townes collection, Gainesville, Florida.
Paratypes. CANADA. Alberta: Coleman, VI-12-1962 (1 male, 1 female), K. C. Hermann (CNC); Elkwater, VI-4-1952 (1 female), A. R. Brooks (CNC); Kananaskis, For. Exp. Stn. Seebe, June 29, 1962 (1 female), W.R.M. Mason (CNC); Lavine, VI-11-1952 (1 male), A.R. Brooks (CNC); Morley, 8 mi. e.

VI-22-1962 (1 male), W.R.M. Mason (CNC); Onefour, VI-2-1956 (1 female), O. Peck (CNC); Waterton, June 11, 1962 (1 female), K. C. Hermann and June 11-1962 (1 male), W.R.M. Mason (CNC). British Columbia: Kelowna, VII-14-1950 (1 female), B. P. Beirne (CNC); Kamloops, VI-1-1938 (1 female), G. S. Walley (CNC); Oliver, V-17-1959 (1 male), L. A. Kelton (CNC); Robson, VI-13-1952 (1 male), H. R. Foxlee (CNC); Trinity Valley, V-21-1959 (1 female), L. A. Kelton (CNC). New Brunswick: Kouchibouguac Nat. Pk., (1 female), VIII-30-1977, S. J. Miller (CNC). Prince Edward Island: Alberton, VIII-4-1940 (1 male), ex. lep. on fireweed, J. McDunnoughi (CNC). Saskatchewan: Elbow, VI-17-1960 (1 female), A. R. Brooks (CNC); Sakatoon, V-9-1949 (1 female), A. R. Brooks (CNC). UNITED STATES. California: nr. Glacier Pt., Yosemite Pk., July 16, 1948 (1 male), H., M., G., D., & J. Townes (HMT); Lee Vining, June 25, 1948 (1 male), H., M., G., & D. Townes (HMT); May L., Yosemite Pk., 10,500', July 27, 1948 (1 female), H., M., G., D., & J. Townes (HMT); nr. Mono Pass, Inyo Co., 12,000', VIII-15-1957 (1 female), C. D. MacNeill (CAS); Nevada Co., Whitecloud campground, V-30-31-1964 (14 males, 2 females), P. H. Arnaud (CAS); Mint Canyon, Solemint, IV-28-1955 (1 female), W. R. Richards (CNC); Oakland, V-3-1937 (1 male), E. S. Ross (HMT); Ruby Lake, Inyo Co., 11,500', VIII-13-1957 (1 female), C. D. MacNeill (CAS); nr. Sonora Pass, 8,000', July 6, 1948 (3 males) and 8500', July 4 (1 female), July 7 (1 male), H., M., G., & D. Townes (HMT). Colorado: Doolittle Ranch, Mt. Evans, 9,800', VIII-3-1961 (1 male), W.R.M. Mason (CNC) and July 20, 1964 (1 female), C.D. Dasch (CDC); Echo Lk., Mt Evans, July 11, 1978 (1 female), B. & R. Dasch (CDC); Gould, VIII-5-1974 (1 male), H. & M. Townes (HMT); Loveland Pass, 9850', VIII-8-1961 (1 male), B. H. Poole (CNC); Mt. Evans, 11,700', July 29, 1961 (2 males), C. H. Mann, S. M. Clark (CNC); Muddy Pass, Jackson Co., 8,800', VIII-15-1961 (2 males), B. Poole (CNC); Nederland, Science Lodge, 9,500', VI-28-1961 (1 male), B. H. Poole and VII-4-1961 (2 males, 1 female), J. R. Stainer, and VII-3-1961 (1 male), B. H. Poole (CNC); Niwot Ridge, nr. Ward, July 4, 1961 (5 females) C. H. Mann (CNC). Idaho: Lowman, Aug. 9, 1978 (1male), H. & M. Townes (HMT); nr. Stanley, Aug. 8, 1978 (1male), H. & M. Townes (HMT). Michigan: Iron Co., July 1, 1970 (1 female), Nemah Hussein (HMT). Montana: Glacier Nt. Pk., July 4, 1973 (1 female), B. & C. Dasch (CDC). Nevada: Angel Lake, 12 mi. sw. Wells, 8,400', VII-11-1961 (1 female), B. H. Poole (CNC); Denio, May 31, 1978 (2 females), H. &. M. Townes (HMT); Tuscarora, June 5, 1978 (1 male, 3 females), H. & M. Townes (HMT). New Mexico: Las Cruces (1 female), coll. ?, (USNM). Oregon: Brothers, July 9, 1978 (2 males), H. &. M. Townes (HMT). Texas: 10 mi. w. Ft. Davis, 5,000', May 29, 1959 (1 female) W.R.M.Mason (CNC); unknown locality, Apr. 7, 1934, ex. Plutella maculipennis, coll. ? (CNC). Utah: Henry's Fork Pk., Summit Co., VIII-1-10-1979 (3 females), S. & J. Peck (CNC). Wyoming: Lusk, VII-6-1961 (1 female), H. Howden (CNC). MEXICO. Toluca, 8800', 17-VIII-1954 (1 female), J. G. Chillcott (CNC).

Etymology: The species epithet is in reference to the variable nature of the colouration of the abdomen (with or without a banding pattern) and the areolet of the fore wing which can be open or closed.

Host and Biology. The species has been reared from an unidentified lepidopteran on fireweed and from Plutella maculipennis on cabbage. There is probably a single generation per year and occurs later in areas of high elevation.

Remarks. This species is closely related to asperata but differs from the latter in having a much stouter ovipositor and in the petiole which is smooth sided.



Cymodusopsis asperata, new species

Fig. 9

Cmpd. eyes moderately convergent ventrad in females, not distinctly hairy. Fore wing with areolet open. Abdominal petiole with sides rough and usually grooved dorso-laterally at base. Ovipositor with depth at mid length less than width of hind basitarsus. Antenna uniformly black. Abdominal tergites uniformly black.

HOLOTYPE. Female. Antennal flagellum with 29 articles, the basal article approx. 3.7 x as long as wide. Antennal scape with inner margin approx. 1.4 x as long as outer margin. Cmpd. eyes moderately convergent ventrad, with lower facets approx. 1.4 x as wide as upper facets. Face shagreened, matte, with dense silvery pubescence arising from minute punctures. Tentorial pit separated from inner margin of cmpd. eye by distance approx. equal to 4.0 x dia. of pit. Clypeus moderately convex, its anterior margin moderately convex. Mesopleuron with lower 0.5 shagreened, matte, with widely spaced, minute punctures. Propodeum moderately long, with apex projecting between bases of hind coxae a distance approx. equal to 0.3 x the length of hind coxa. Propodeal carinae strong, complete. Areola completely confluent with petiolar area. Hind femur approx. 5.2x as long as deep. Hind tarsal claw with weak teeth at base. Petiolar segment of abdomen weakly decurving, with petiole approx. 1.6 x as long as postpetiole. Sides of petiole rough. Second abdominal tergite approx. 1.6 x as long as wide, with thyridium at basal 0.3. Ovipositor approx. 1.9x as long as hind femur, weakly upcurving, with depth at mid length less than width of hind basitarsus. Fore wing approx. 4.2 mm. long, with areolet open. Hind wing with nervellus not intercepted.

Antenna, head, thorax, abdomen, dorsal surface of fore and middle coxae, entire hind coxa, basal segment of hind trochanter, black. Palpi fulvous. Tegula white. Ventral surfaces of fore and middle coxae yellowish. Fore trochanter with basal segment yellow dorsally, fuscous ventrally; middle trochanter with basal segment fuscous, apical segment yellow; hind trochanter with apical segment fuscous. Fore and middle femora and tibiae fusco-ferrugineous. Hind femur dark fuscous basally, paler apically. Hind tibia fuscous basally internally, and apically, with externo-median surface fulvous. Hind tarsus fuscous.

Range and Variation. Antennal flagellum with 24-28 articles. Basal article of flagellum approx. 3.7-3.8 x as long as wide. Lower 0.5 of mesopleuron with fine to small punctures. Petiolar segment of abdomen weakly to moderately decurving. Second abdominal tergite approx. 1.6-1.8 x as long as wide. Hind femur approx. 5.2-5.4 x as long as deep. Ovipositor approx. 1.8-1.9 x as long as hind femur. Fore wing approx. 4.0-5.0 mm. long. Femora commonly more ferrugineous than in holotype, with fuscous areas confined mainly to baso-ventral surface.

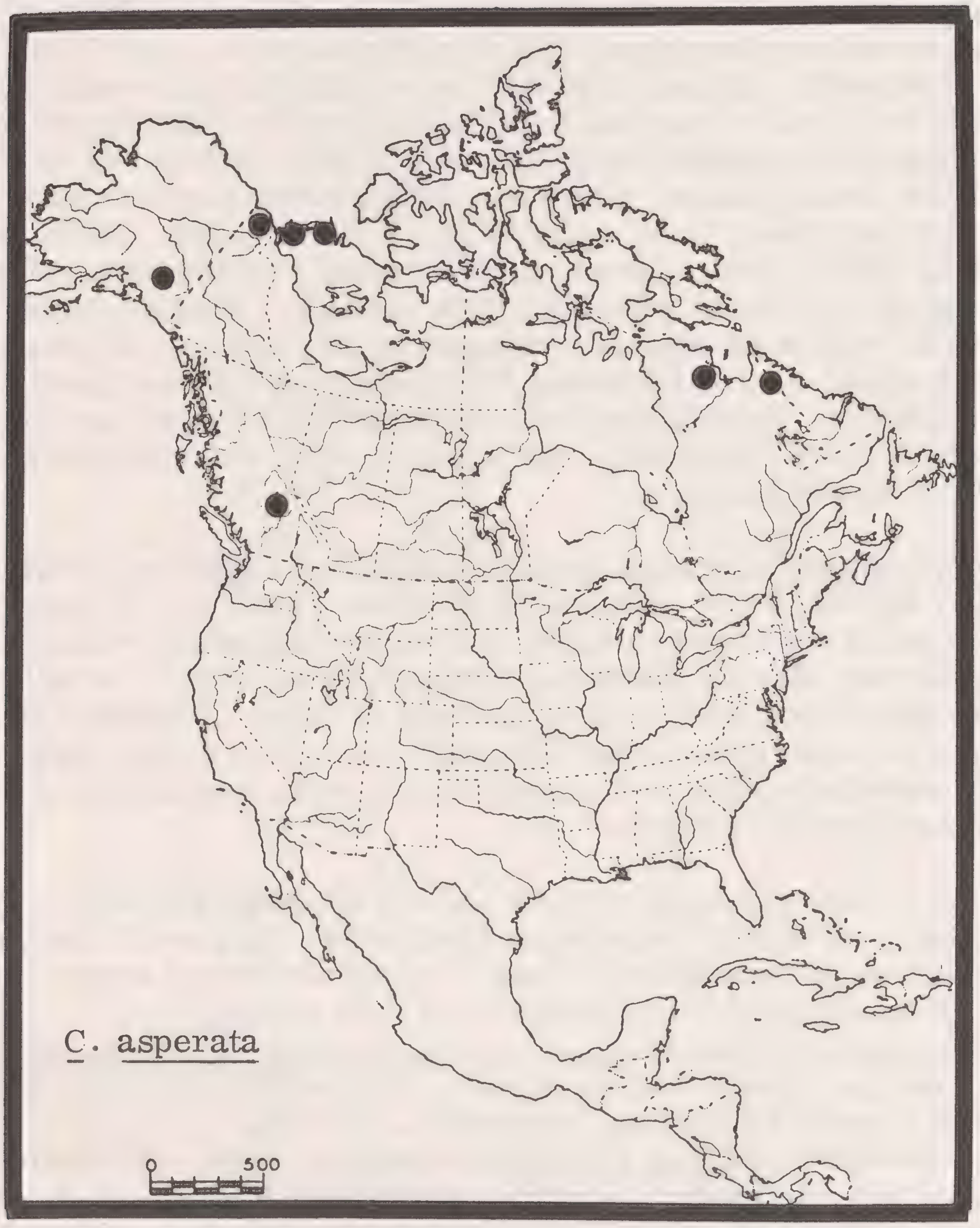
Male. Hind femur approx. 4.6-5.0 x as long as deep. Petiolar segment of abdomen nearly straight. Coloured as female but with greater tendency towards melanism particularly the legs . Second abdominal tergite approx. 1.8-2.0 x as long as wide. Hind tibia long, very slender.

Holotype. Female. Tangle Lakes, Alaska, VIII-6-1973, H. & M. Townes. Deposited in Townes collection, Gainesville, Florida.
Paratypes. CANADA. British Columbia: Williams Lake, VIII-20-1960 (1 male) B. Heming (CNC). Labrador: Hebron, VII-28-1954 (1 male), E.E. Sterns (CNC). Northwest Territories:Kovaluk R., 69°11N 131°W, July 6-10, 1971 (1 female), W.R.M.Mason (CNC); 20 mi. e. Tuktoyaktuk, 13-16 July, 1971 (1 male), W. R.M. Mason (CNC). Quebec: Payne Bay, 21-VII (1 male), 26-VII (1 male), 27-VII (2 males), 11-VIII (1 female), 12-VIII (1 female), 19-VIII (1 female), 1958, W.R.M. Mason (CNC). Yukon: British Mts., Firth R., 24-VII-1956 (1 male), R. E. Leech (CNC). UNITED STATES. Alaska: Tangle Lakes (1 male, 2 females), same data as for holotype (HMT).

Etymology: The species epithet is translated as 'rough' in reference to the sides of the abdominal petiole.

Host and Biology. There are no rearing records for this species. Adults are active during July and August and ther appears to be a single generation per year.

Remarks. This species appears to be very closely related to variabilis but it is easily distinguished from the latter on the basis of the following characters: sides of abdominal petiole rough; hind femur stouter; ovipositor longer and more slender; abdomen never with a banding pattern.



Cymodusopsis macdunnoughi, new species

Fig. 10

Cmpd. eyes weakly notched opposite antennal sockets, weakly convergent ventrad in females, with hairs of normal length. Propodeal carinae very strong. Fore wing with areolet open. Ovipositor approx. 1.7 x aslong as hind femur, weakly upcurving, with depth at mid length approx. equal to width of hind basitarsus. Hind femur rather stout. Abdomen uniformly dark fuscous.

HOLOTYPE. Female. Antennal flagellum with 28 articles, the basal article approx. 3.9 x as long as wide. Antennal scape with inner margin approx. 1.4 x as long as outer margin. Cmpd. eyes weakly notched opposite antennal sockets weakly convergent ventrad with hairs of normal length. Face strongly shagreened, matte, with minute punctures. Tentorial pit separated from inner margin of cmpd. eye by distance approx. equal to 2.0 x dia. of pit. Clypeus strongly convex, its anterior margin moderately convex. Mesopleuron with lower 0.5 strongly shagreened, matte, with small punctures which are separated by distance 1.0-2.0 x dia. of single puncture. Propodeum moderately long, with apex projecting between bases of hind coxae a distance approx. equal to 0.3 x the length of hind coxa. Propodeal carinae very strong. Areola approx. 0.8 x as wide, 0.6 x as long as petiolar area, with surface granular. Petiolar area with moderately coarse transverse wrinkles. Hind femur approx. 4.5 x as long as deep. Hind tarsal claw pectinate along basal 0.5. Petiolar segment of abdomen straight, with petiole approx. 1.5 x as long as postpetiole, its sides smooth, polished. Ovipositor approx. 1.7 x as long as hind femur, weakly upcurving, with depth at mid length approx. equal to width of hind basitarsus. Fore wing approx. 3.6 mm. long, with areolet open. Hind wing with nervellus weakly intercepted.

Antenna, head, thorax, abdomen, dorsal surface of fore coxa, entire middle (except extreme apex) and hind coxae, black. Palpi, tegula white. Ventral surface of fore coxa, fore trochanter, apex of middle coxa, middle trochanter, apical segment of hind trochanter, yellow. Basal segment of hind trochanter fuscous. Fore and middle femora ferrugineous; hind femur ferrugineous with basal and apical infuscation. Fore tibia ferrugineous; middle tibia ferrugineous, with weak apical infuscation; hind tibia with basal and apical fuscous bands, the median band pale ferrugineous. Hind tarsus pale fuscous.

Range and Variation. Known only from holotype specimen.

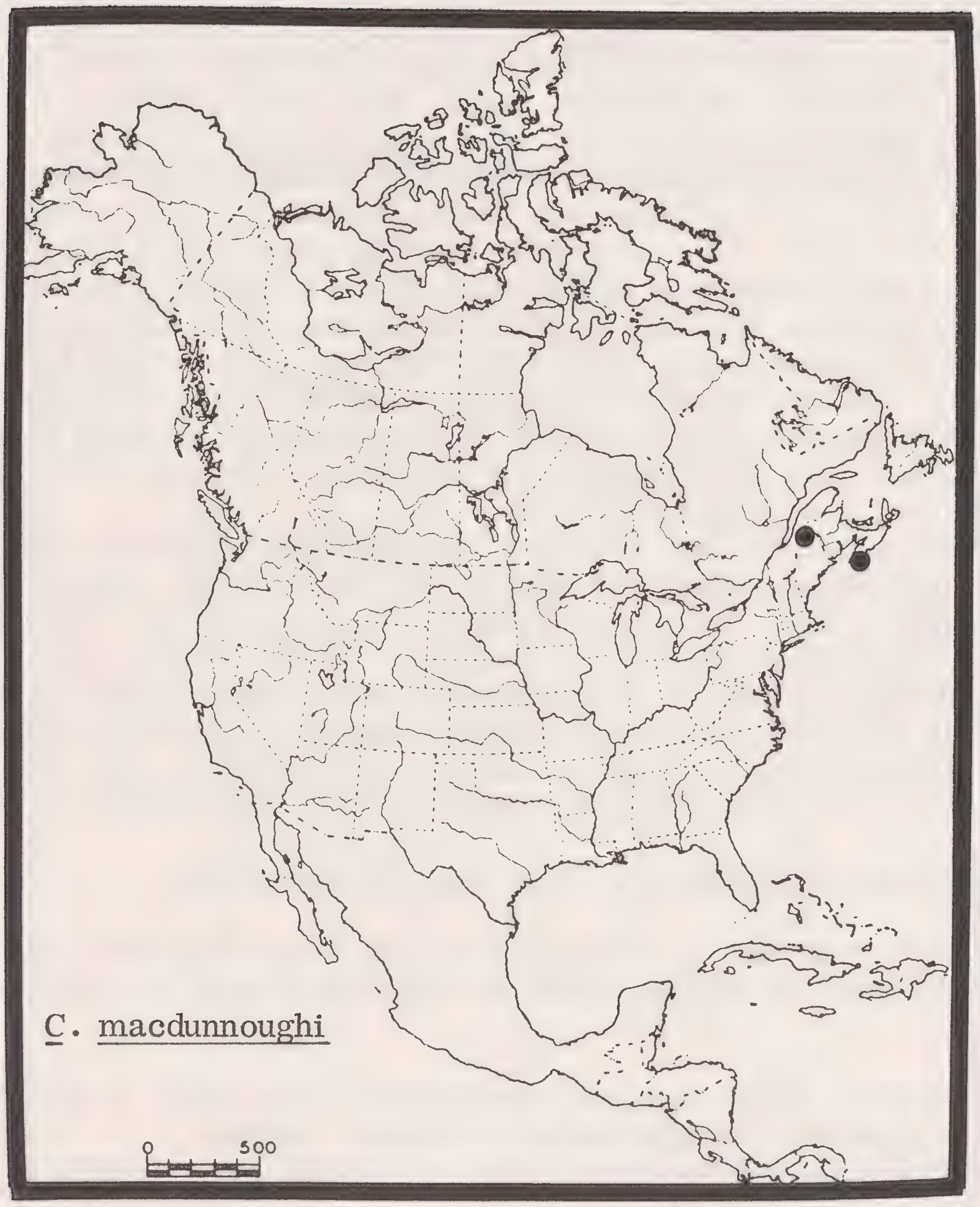
Male. Hind femur approx. 4.0-4.5 x as long as deep. Hind tibia rather short and stout. Coloured as female except that banding of hind tibia generally more distinct.

Holotype. Female. Petite Riviere, Nova Scotia, 5-IX-1935, J. Macdunnoughi. Deposited in Canadian National Insect Collection Ottawa.
Paratypes. Quebec: Park Reserve, Kam. Co., 950', 24-VIII-1957 (6 males), W.R.M. Mason (CNC).

Etymology. This species is named in honour of J. Macdunnoughi, the collector of the holotype specimen.

Host and Biology. Reared from unidentified microlepidoptera on cherry (pupal case missing). This appears to be a late summer species.

Remarks. The weakly notched, weakly convergent cmpd. eyes, stout hind femur, unusually short and stout hind tibia of males, in combination with the uniformly coloured abdomen will distinguish this species from other nearctic Cymodusopsis.



Cymodusopsis latifacies, new species

Fig. 11

Cmpd. eyes weakly convergent ventrad in female with hairs of normal length. Face unusually broad, particularly in male. Clypeus unusually broad. Tentorial pit separated from inner margin of cmpd. eye by distance approx. equal to 4.0 x dia. of pit. Petiolar segment of abdomen weakly decurving. Ovipositor approx. 1.8 x as long as hind femur, more or less straight, with depth at mid length greater than width of hind basitarsus. Abdomen black.

HOLOTYPE. Female. Antennal flagellum with 26 articles, the basal article approx. 4.2 x as long as wide. Antennal scape with inner margin approx. 1.4 x as long as outer margin. Cmpd. eyes weakly convergent ventrad, with hairs of normal length, with lower facets approx. 1.4 x as wide as upper facets. Face shagreened, matte, unusually broad, with minute punctures. Tentorial pit separated from inner margin of cmpd. eye by distance approx. equal to 4.0 x dia. of pit. Clypeus broad, moderately convex, its anterior margin weakly convex. Mesopleuron with lower 0.5 strongly shagreened, matte, with small punctures which are separated by distance less than or equal to dia. of single puncture. Propodeum short, with apex projecting between bases of hind coxae a distance approx. equal to 0.2 x length of hind coxa. Propodeal carinae very strong. Areola completely confluent with petiolar area, approx. 0.4 x as wide, 0.5 x as long as petiolar area. Surface of petiolar area polished, with moderately coarse transverse wrinkling. Hind femur approx. 5.3 x as long as deep. Hind tarsal claw pectinate for slightly more than half its length. Petiolar segment of abdomen weakly decurving, the petiole approx. 1.6 x as long as postpetiole, its sides slightly rough, polished. Second abdominal tergite approx. 1.5 x as long as wide. Ovipositor approx. 1.8 x as long as hind femur, more or less straight, with depth at mid length greater than width of hind basitarsus. Fore wing approx. 4.1 mm. long, with areolet open. Hind wing with nervellus weakly intercepted.

Antenna head, thorax abdomen, dorsal surfaces of fore and middle coxae, hind coxa, basal segment of middle and hind trochanters, black. Palpi and tegula white. Fore , middle coxae with ventral surfaces yellow. Fore trochanter yellow, with some infuscation on basal segment; middle trochanter with basal segment mostly fuscous, apical segment yellow; hind trochanter with apical segment fuscous basally, yellow apically. Fore femur pale ferrugineous; middle femur ferrugineous, with small baso-ventral infuscated patch; hind femur ferrugineous, with weak baso-ventral and apico-dorsal infuscated areas. Fore tibia with sub-basal and apical bands, its inner surface ferrugineous, its externo-median surface white; middle tibia coloured as fore tibia; hind tibia with weak basal and apical fuscous bands, the median band yellow-ferrugineous. Hind tarsus fuscous. Wings weakly infuscated.

Range and Variation. Antennal flagellum with 26-28 articles, the basal article approx. 4.2-4.4 x as long as wide. Hind femur approx. 5.3-6.1 x as long as deep. Second abdominal tergite approx. 1.3-1.5 x as long as wide. Fore wing approx. 3.5-4.5 mm. long. Lower 0.5 of mesopleuron sometimes with weak rugosities. No significant colour variation in specimens at hand.

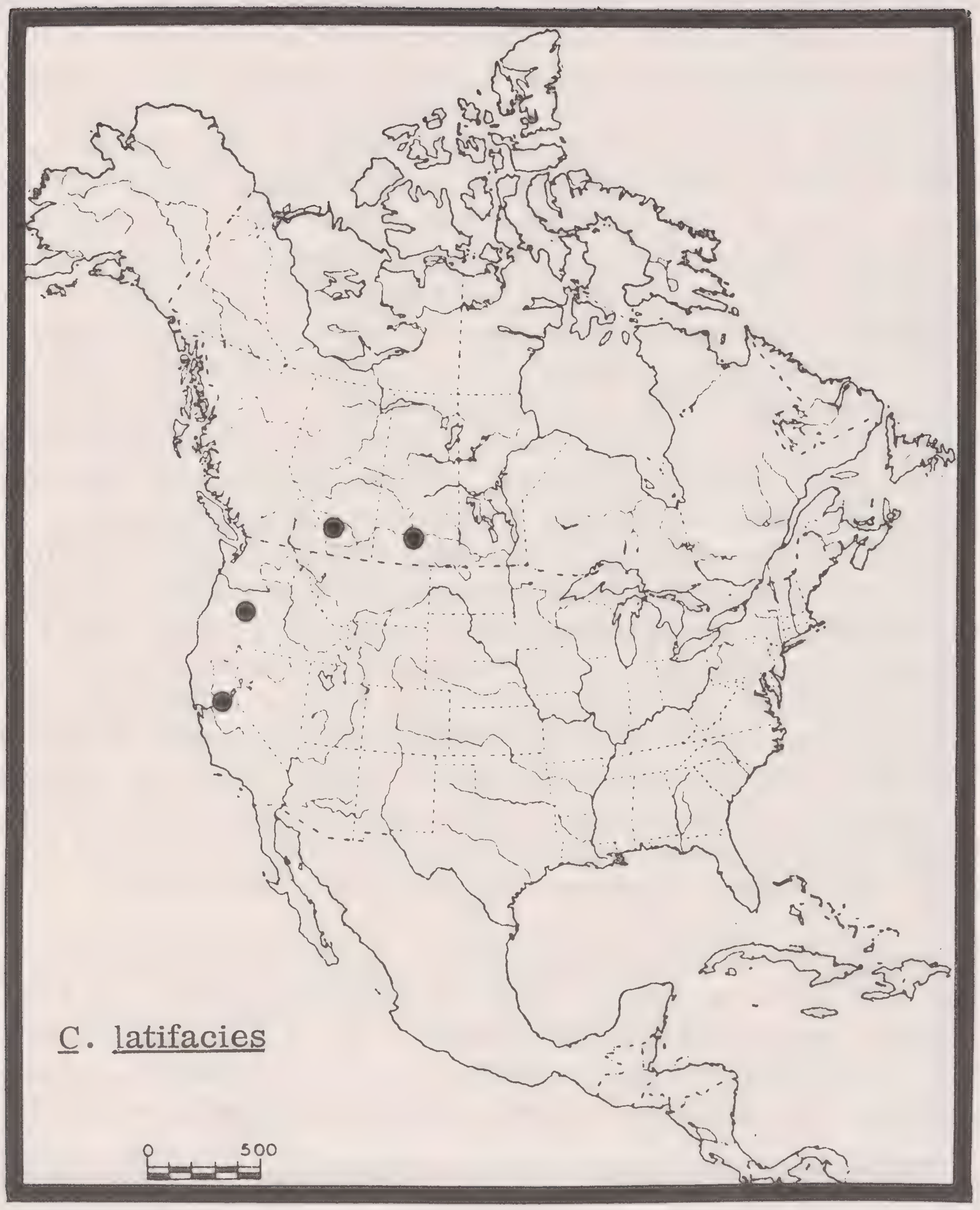
Male. Face very broad. Hind femur approx. 5.6-5.8 x as long as deep. Second abdominal tergite approx. 1.7-1.8 x as long as wide. Coloured as female.

Holotype. Female. Ochoco Cr., Oregon, VII-11-1978, H. & M. Townes. Deposited in Townes collection, Gainesville, Florida.
Paratypes. CANADA. Saskatchewan: Saskatoon, 9-V-1949 (2 females), A. R. Brooks (CNC). UNITED STATES. California: Nevada Co., White Cloud Campground, 30-31-V-1964 (13 males, 3 females), P. H. Arnaud Jr. (CAS). Colorado: Boulder, 4.5 mi. n., 5500' , June 20, 1961 (1 female), W. R. M. Mason (CNC).

Etymology. The species epithet is in reference to the unusually broad face.

Host and Biology. There are no rearing records for this species. Adults are active in spring and early summer.

Remarks. The broad face will easily distinguish this species from all nearctic Cymodusopsis except brevicauda but is distinguished from the latter by its (latifacies) small size , longer ovipositor (relative to hind femur), and black abdomen.



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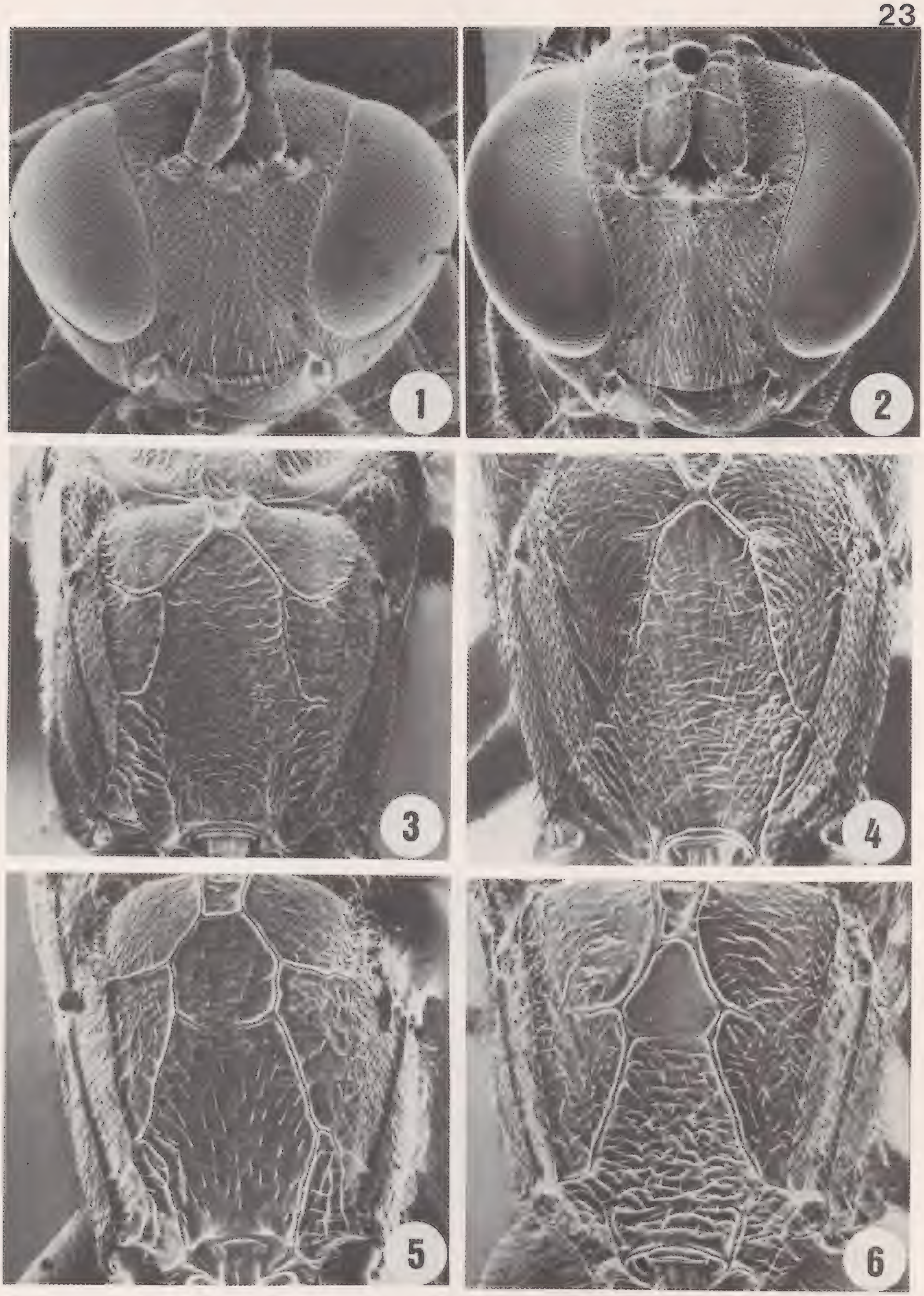
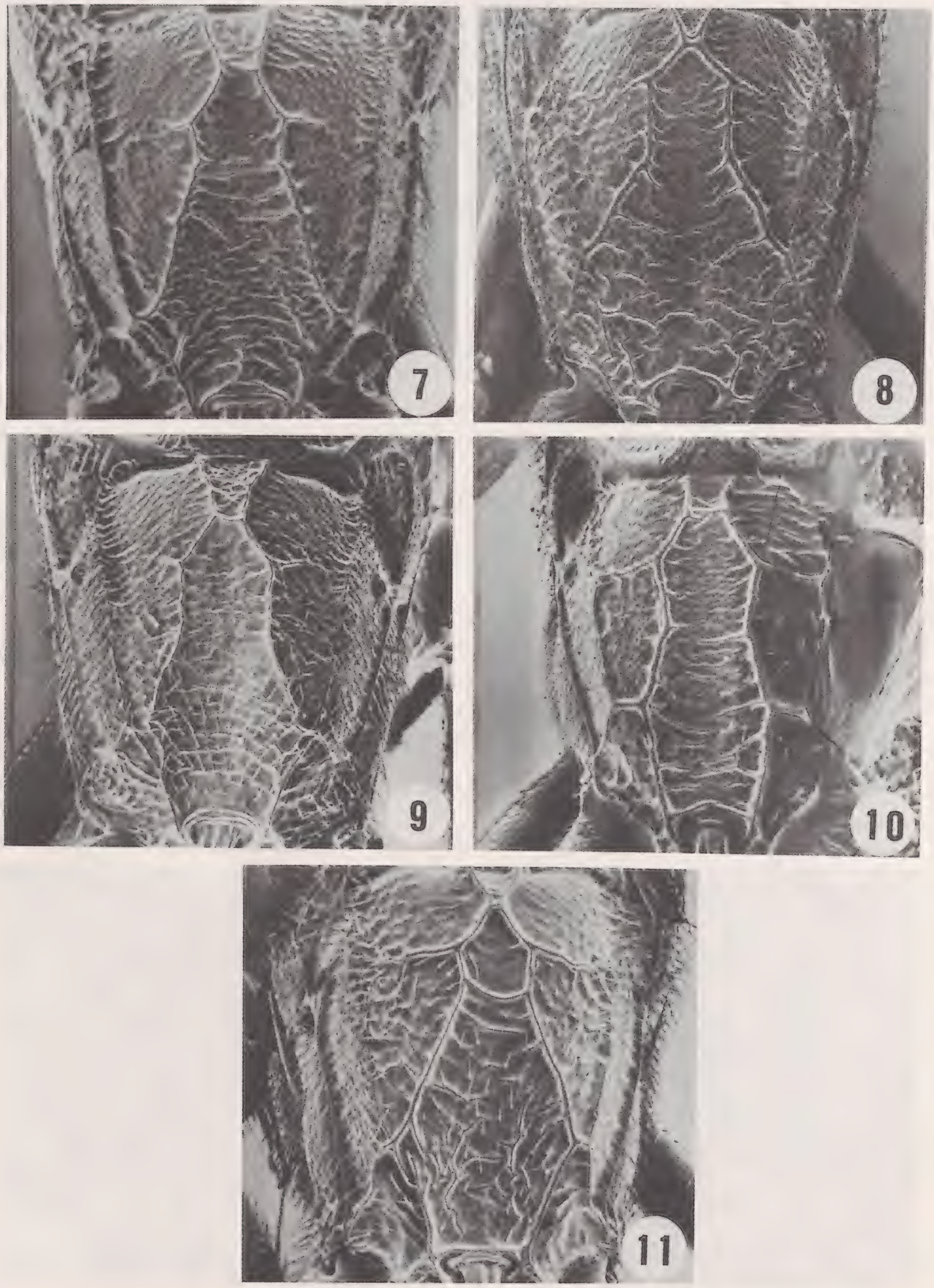


Cymodusopsis spp.: Figs. 1-2, frontal view of head: 1, melanosoma; 2, nigricincta. Figs. 3-6, propodea: 3, aristoteliae; 4, albiscapa; 5, melanosoma; 6, nigricincta.



Cymodusopsis spp.: Figs. 7-11, propodea: 7, brevicauda; 8, variabilis; 9, asperata; 10, macdunnoughi; 11, latifacies.